

UNITED STATES OF AMERICA  
DEPARTMENT OF TRANSPORTATION  
FEDERAL AVIATION ADMINISTRATION  
RENTON, WASHINGTON 98055-4056

In the matter of the petition of

**The Boeing Company**

for an exemption from §§ 25.855(h)(2) and  
25.857(e)(4) of Title 14, Code of Federal  
Regulations

**Regulatory Docket No. FAA-2003-14839**

**GRANT OF EXEMPTION**

By letter dated March 31, 2003 (B-H360-03-1732), Mr. D. S. Blankinship, Manager, Certification, Twin Aisle Deliveries & Fleet Support, B-H360, The Boeing Company, P.O. Box 3707, Seattle, Washington 98124, petitioned for a time limited exemption from the requirements of §§ 25.855(h)(2) and 25.857(e)(4) as amended by Amendment 25-60 of Title 14, Code of Federal Regulations (14 CFR). This exemption, if granted, would permit The Boeing Company, to be temporarily relieved from the requirements pertaining to class E cargo compartments regarding the exclusion of hazardous quantities of smoke, flames, or noxious gases from the flight crew compartment. This exemption will apply to Model 747-400F airplanes powered by Pratt & Whitney (PW) 4000 Ring Compressor Case (RCC) engines or PW4000 Segmented Compressor Case (SCC) engines with SCN 13/AO EEC software, only.

**The petitioner requests relief from the following regulations:**

**Section 25.855(h)(2)**, as amended by Amendment 25-60, requires that flight tests must be conducted to show compliance with the provisions of § 25.857 concerning the entries of hazardous quantities of smoke or extinguishing agent into compartments occupied by the crew or passengers.

**Section 25.857(e)(4)**, as amended by Amendment 25-60, requires that for a Class E cargo compartment there are means to exclude hazardous quantities of smoke, flames, or noxious gases, from the flight crew compartment.

**The petitioner's supportive information is as follows:**

“The Boeing Company hereby petitions for expedited consideration of a exemption from the requirements of 14 CFR 25.855(e)(2) [(h)(2)] at Amendment 25-60 and 25.857(e)(4) at Amendment 25-60 for a limited period of time not to exceed eighteen months. Boeing is requesting this time to resolve an unknown compliance condition. Demonstrating compliance with the above mentioned FAR paragraphs when PW4000 RCC engines or SCN 13/AO EEC software is installed, may require minor modifications to a component (a valve) in the Model 747-400F Environmental Control System (ECS). The valve modifications would maintain air conditioning pack flows despite the reduced bleed pressures associated with the PW4000 RCC engines or SCN 13/AO EEC software during cargo smoke procedures.

“Modifying the valve could take several months, including design, certification, and delivery to airplane operators. Other methods to enable successful compliance demonstration, such as operational restrictions and crew procedures, were also considered. The ECS component modification is the only method expected to reliably provide compliance. Granting this time-limited exemption will allow continued manufacture, modification, certification, and delivery of Model 747-400F airplanes with the improved PW4000 engines/software, addressing the engine surge issue, without waiting for the modified ECS components. Also, granting this exemption will allow Boeing and Pratt & Whitney to release service bulletins, with the delivery of improved PW4000 engines beginning as soon as April 15, 2003.”

Public Interest

“Granting the petition will enable immediate incorporation of urgently needed PW4000 engine safety enhancements, while Boeing addresses the potential ECS non-compliance issue. The fleet affected by the potential non-compliance is small (25 airplanes), and the risk of the event addressed by the FARs (a main deck fire where hazardous quantities of smoke could escape to the upper deck despite the crew fire fighting procedures and other mitigating factors) has been historically shown to be extremely unlikely. The eighteen-month time limit will also ensure the ECS compliance issue is resolved in a timely manner.”

Boeing provided supplemental material stating that: “Pratt & Whitney released Service Bulletin PW4ENG 72-755 on February 28, 2003, without a corresponding Boeing FAR Part 25 approved Service Bulletin, so that the work to install the Ring Case HPC hardware could commence in engine shops. FAR Part 25 approval of the Boeing Service Bulletin related to the Ring Case HPC is expected during the week of April 14, 2003. Part 25 approval of this service bulletin for the 747-400F is pending the issuance of the subject exemption. An operator plans to incorporate the first retrofitted Ring Case HPC engine by the end of April 2003, or as soon as possible thereafter following release of the approved Boeing Service Bulletin.”

In addition, Boeing states, “if this petition is not granted, Boeing, Pratt & Whitney, and Model 747-400F operators will be severely constrained in their ability to incorporate the PW4000 engine improvements. As the PW4000 engines are also used on other Boeing aircraft models, these constraints would slow the introduction of the improved engines into the overall fleet. In addition, operators would face a significant economic burden to maintain separate engine pools as the engine improvements were introduced on other models.”

Boeing points out that an exemption from these requirements, subject to the limitations, is in the public interest and maintains that safety is not adversely affected. They also request that processing of their petition be expedited by waiving the public comment period.

### **FAA’s Determination as to Need for Public Process**

For reasons discussed in detail below, the FAA has determined that good cause exists for waiving the requirement for Federal Register publication and public comment because the exemption, if granted, would not set a precedent, and any delay in acting on this petition would be detrimental to maintaining an adequate level of safety.

### **The FAA’s analysis/summary is as follows:**

Engine surge (loss of power) issues with the PW4000 series engines are such that an Airworthiness Directive is being issued to provide engine stability enhancement. Boeing believes that incorporation of engine modifications to improve engine stability is needed in a timely manner. However, the reduced engine bleed airflow associated with the current engine improvements affect the ECS such that compliance with certain airworthiness provisions cannot be demonstrated at this time. The resolution of the ECS ventilation issues will require an additional design change, which will take more time to develop and approve. While the PW4000 engine surge concern is being addressed by an Airworthiness Directive for the engine, the non-compliance issue pertains only to the freighter model due to a different ECS design.

The petitioner requests expedited consideration of an 18-month time-limited exemption from the requirements of §§ 25.855(h)(2) and 25.857(e)(4). Sections 25.855(h)(2) and 25.857(e)(4) require that transport category airplanes be designed so that ventilation within the occupied areas is controlled such that hazardous quantities of smoke or extinguishing agent do not enter occupied compartments. The resultant changes in ventilation caused by the reduced engine bleed pressures within the occupied areas are expected to be small relative to the original certified levels. These changes occur only during limited segments of flight and for specific failure conditions. Furthermore, in the event of a cargo compartment fire, though it may be possible for smoke or extinguishing agent to enter occupied areas for a brief time period, the crew would activate smoke evacuation procedures to alleviate the situation. The FAA also considers that the PW4000 series engine stability issues are currently an overriding safety concern and

should be immediately addressed. Therefore, the FAA supports Boeing's desire to introduce the modified engines into the fleet as soon as possible.

### **The Grant of Exemption**

In consideration of the foregoing, I find that a grant of a time limited exemption, until October 20, 2004, is in the public interest and will not adversely affect the level of safety provided by the regulations. Therefore, pursuant to the authority contained in 49 U.S.C. 40113 and 44701, delegated to me by the Administrator, The Boeing Company petition for exemption from the requirements of 14 CFR 25.855(h)(2) and 25.857(e)(4) pertaining to Class E cargo compartments and the exclusion of hazardous quantities of smoke, flames, or noxious gases from the flight crew compartment on Boeing Model 747-400F airplanes, is hereby granted until October 20, 2004.

Issued in Renton, Washington, on April 18, 2003.

*/s/ Mike Kaszycki*

Mike Kaszycki

Acting Manager

Transport Airplane Directorate

Aircraft Certification Service



U.S. Department  
of Transportation

**Federal Aviation  
Administration**

**Transport Airplane Directorate  
Aircraft Certification Service**

1601 Lind Avenue, S.W.  
Renton, Washington 98055-4056

May 1, 2003

**Exemption No. 8029  
Regulatory Docket No. FAA-2003-14839**

Mr. D. S. Blankinship  
Manager, Airplane Certification, B-H360  
The Boeing Company, P.O. Box 3707  
Seattle, Washington 98124

Dear Mr. Blankinship:

Your letter dated April 28, 2003, to Ms. Vi Lipski, requests clarification of the intent of Exemption No. 8029 regarding smoke penetration from a cargo compartment fire into the occupied areas, including the supernumerary area, of the Boeing Model 747-400F airplane.

This grant of exemption relieves Boeing from the obligation to demonstrate compliance with the provisions of §§ 25.855(h)(2) and 25.857(e)(4). Those provisions address the cabin ventilation requirements to prevent hazardous quantities of smoke or extinguishing agent from entering airplane compartments occupied by "crew or passengers." Since this exemption pertains to a freighter model, the FAA omitted the consideration of passengers or other occupants in the text of the exemption. However, note that the regulatory provisions exempted include crew and passengers.

Though the original petition for exemption did not indicate that supernumeraries were to be included, the FAA considers the petitioner's original request and the exempted provisions broad enough to include supernumeraries. Therefore, in response to your request to clarify the applicability to supernumeraries, this letter stipulates that Exemption No. 8029 applies to the occupied areas of the Boeing Model 747-400F, including the flightdeck and supernumerary area.

All other existing provisions of Exemption No. 8029, together with its conditions and limitations, remain the same and continue to be applicable.

This letter is part of, and shall be attached to, Exemption No. 8029.

Sincerely,

/s/ Neil D. Schalekamp  
Neil D. Schalekamp

